

Evaluation of the Morbidity of Routine Cystoscopy Performed Intraoperatively During Total Laparoscopic Hysterectomies

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ABSTRACT

Study objectives: The primary objective is to determine the rate of morbid events (urinary tract infection, hematuria, urinary retention, false positive, incidental finding) associated with routine cystoscopies performed intraoperatively during total laparoscopic hysterectomies (TLH). The secondary objectives are 1) to determine the rate of urinary complications during TLHs in our centers and 2) to determine the detection rate of urinary complications using cystoscopy during TLHs.

Method: Descriptive retrospective multicenter study. The study took place in Obstetrics & Gynecology departments of 2 university centers in Montreal. Patients underwent a routine cystoscopy during their TLH for a benign reason in our centers. Five hundred thirty-one charts from January 1, 2012 to January 31, 2018 were reviewed.

Results: The morbidity rate of routine cystoscopies during TLHs is 4.19% (22/524 cases) in our centers. Our urinary complication rate is 2.45% (13/531 cases). Of these 13 complications, 4 were detected by cystoscopy.

Conclusion: The usefulness of routine cystoscopies performed intraoperatively during TLHs is questionable due to the number of morbid events and the low rate of urinary trauma in our centers. However, it is hard to establish a direct causality link between certain morbid events and cystoscopy. More studies should be conducted on this subject.

Key Words: Morbidity, Routine cystoscopy, Total laparoscopic hysterectomy, Urinary complication.

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INTRODUCTION

Laparoscopic surgery has been gaining popularity in the field of gynecology since the 1990's. This approach presents numerous advantages for hysterectomies compared to laparotomies, including reduced morbidity, hospitalization length of stay, and recovery time.¹ However, it is also recognized that a laparoscopic approach increases the risk of urinary traumas.¹ A delay in detecting these traumas can increase morbidity for the patients, increases readmission and reintervention risks, and presents medical-legal issues.² Thus, performing a routine intraoperative diagnostic cystoscopy during total laparoscopic hysterectomies (TLH) is a widely used practice in North-American centers in order to detect these traumas. Certain scholarly organizations, such as the American Association of Gynecologic Laparoscopists, have stated their position in favor of routine intraoperative cystoscopies during TLHs.³

The use of routine intraoperative cystoscopies during TLHs is currently debated for several reasons.⁴ Indeed, a systematic review of 79 studies published in 2015 questions the usefulness of this procedure.⁵ In addition, routine cystoscopy could lead to morbid events. Currently, only one study, conducted in 2003 in the US, addressed morbidity associated with routine cystoscopies during hysterectomies.⁶ It is a retrospective observational study of 101 hysterectomy cases, of which 20 were laparoscopy-assisted vaginal hysterectomies.

The objective of this study is primarily to determine the rate of morbid events associated with the use of routine intraoperative cystoscopy during TLHs. Secondary objectives are to determine the rate of urinary complications associated with TLHs as well as to determine the detection rate of these complications by routine cystoscopy.

SUBJECTS & METHODS

Our study consists of a descriptive retrospective multicenter study. The primary objective is to determine the rate of morbid events associated with routine cystoscopies performed intraoperatively during TLHs for benign conditions in our 2 university centers. The morbid events of interest are urinary tract infections, hematuria, urinary traumas, urinary retention, incidental findings, and unnecessary investigations or false positives.

Our study includes 2 secondary objectives, the first one being to determine the rate of urinary complications associated with TLHs for benign conditions in our centers. The second objective is to determine the detection rate of urinary complications by routine cystoscopy during TLHs.

Included in our study are TLHs for benign conditions (fibroids, abnormal uterine bleeding, endometriosis, etc.) during which a routine cystoscopy has been performed. Our exclusion criteria were TLHs for neoplasia as well as concurrent surgeries for prolapse correction or urinary incontinence correction. We have also not considered urinary complications that happened over 30 days post-surgery.

Collected demographic data were body mass index, age, medications, previous surgeries, and comorbidities. Collected clinical data were surgery indication, uterus weight, presence of adhesions, operating time, and blood losses. Institutional Review Board approval was received on May 1, 2019 for both centers.

RESULTS

In total, 531 charts from 2 university centers were reviewed for this study. The considered TLHs were performed between January 1, 2012 and January 31, 2018. **Table 1** summarizes demographic characteristics of the subjects.

Regarding the primary objective, there were 18 morbid events identified out of 524 reviewed cases, for a morbidity rate of 3.44%. To note, we use the denominator 524 because 7 charts were excluded for the primary objective

Table 1.
Demographic and Clinical Data

Age	
Mean	45 years
Range	21–78 years
Mean body mass index	29
Comorbidity rate	82%
Previous laparotomies	29%
Indications for surgery	
Fibroids	30%
Bleeding	23%
Other	47%
Operating time	
Mean	148 minutes
Range	35–465 minutes
Uterus weight	
Mean	194 g
Range	22–1280 g
Mean blood losses	143 ml

as there was no cystoscopy performed. Of these 22 morbid events, there were 13 false positives, 4 urinary infections, and 1 urinary retention. **Table 2** presents the details of the morbid events identified in these cases.

For the first secondary objective, there were 13 urinary complications out of 531 cases reviewed, for a rate of 2.45% in our 2 centers. Four of these were ureteral microtraumas, 4 were cystotomies, 3 ureteral entrapments, 1 foreign body, and 1 uretero-vaginal fistula. **Table 3** presents the details of urinary complications identified during TLHs.

The other secondary objective was to determine the detection rate of urinary complications by routine cystoscopy during TLHs. Out of 13 urinary complications, cystoscopy proved to be useful in 4 situations (31%). Seven of the 13 urinary complications were noticed before cystoscopy (cases removed for the calculation of the denominator of the primary objective). There were 2 instances where a cystoscopy was performed but gave a false negative result.

DISCUSSION

As mentioned in the introduction, a number of studies report that routine cystoscopy during TLHs increases

Table 2.
Morbidity Events Associated with Routine Cystoscopies During Total Laparoscopic Hysterectomy

Morbidity Event Type	Clinical History
1 False positive Unnecessary investigation	Absence of left ureteral flow Urology consultation Impossible retrograde cannulation Fluoroscopy Imaging reveals a hypoplastic left kidney
2 False positive Unnecessary investigation	Absence of unilateral ureteral flow Urology consultation Retrograde pyelogram Absence of trauma
3 Urinary infection	Emergency room visit on postoperative day #9 Antibiotherapy
4 False positive Unnecessary investigation	Absence of unilateral ureteral flow Urology consultation Intraoperative investigation Absence of trauma
5 False positive Unnecessary investigation	Weak ureteral flow bilaterally Normal pyeloscan postoperative day #1
6 False positive Unnecessary investigation	Absence of bilateral ureteral flow Urology consultation Normal bilateral cannulation
7 False positive Unnecessary investigation Urinary infection	Absence of ureteral flow Urology consultation Normal bilateral cannulation Antibiotherapy
8 False positive Unnecessary investigation	Absence of ureteral flow Urology consultation Normal bilateral cannulation
9 False positive Unnecessary investigation	Absence of ureteral flow Urology consultation Normal bilateral cannulation
10 False positive	Absence of unilateral ureteral flow No postoperative complications
11 False positive	Absence of left ureteral flow Urology consultation Obstruction seen on retrograde pyelogram Unsuccessful Cannulation attempt Imaging reveals absence of right kidney
12 Urinary infection	Postoperative pyelonephritis on day #10
13 False positive Unnecessary investigation	Absence of unilateral ureteral flow Ureterolysis - Sutures evaluated far from the ureter Repeat cystoscopy – Ureteral flow identified
14 False positive Unnecessary investigation	Absence of bilateral ureteral flow Ureterolysis - Sutures evaluated far from the ureter Repeat cystoscopy and Lasix given – Ureteral flow identified
15 Urinary infection	Cystitis within 30 days postoperation
16 Urinary retention	Urinary retention on postop day #2 Discharge with home catheter Resolved eventually
17 False positive Unnecessary investigation	Absence of unilateral ureteral flow Ureterolysis - sutures evaluated far from the ureter Repeat cystoscopy – Ureteral flow identified

Table 3.
Urinary Complications Related to TLHs

	Urinary Complication	Clinical History
1	Microtrauma	Endometriosis Ureter difficult to visualize Urology consultation for insertion of a Pollack Insertion of a double J-stent due to proximity to dissection area
2	Uretero-vaginal fistula	Normal cystoscopy Postoperative pain Complete transection seen on imaging Percutaneous nephrostomy while waiting for reimplantation Reimplantation left ureter
3	Ureteral pinch	Absence of ureteral jet on one side Urology consultation Removal of a suture on the vault Laparoscopic ureterolysis No ureteral trauma – Double J-stent for caution
4	Microtrauma	Cauterization near ureter Urology consultation Insertion of a double J-stent
5	Cystotomy	Prior caesarean sections x 2 Vesical adhesions - cystotomy Urology consultation Laparoscopic repair then conversion to laparotomy
6	Cystotomy	Vesical adhesions Cystotomy Laparotomy repair
7	Cystotomy	Vesical adhesions Cystotomy Laparoscopic repair Urology consultation Bladder catheter for seven days
8	Cystotomy	Vesical adhesions Cystotomy Laparoscopic repair
9	Foreign body	Indentation/curve seen on cystoscopy Removal of the hemoclip that was placed during the procedure
10	Microtrauma	Cauterization near ureter Urology consultation Insertion of a double J-stent
11	Microtrauma	Suspicion of ureteral trauma during surgery Urology consultation Cystoscopy and cannulation with pollack – judged normal Emergency department consultation PO#9 for pain Trauma to uretero-vesical junction on imaging Insertion of a double J-stent
12	Ureteral pinch	Cystoscopy - Absence of ureteral flow on one side Removal of a suture on the vault Jets visualized bilaterally afterwards

Table 3. Continued

	Urinary Complication	Clinical History
13	Ureteral pinch	Cystoscopy - Absence of ureteral flow on right side Cannulation with resistance Removal of a suture – Ureteral flow visualized afterwards Suspected delayed ureteral trauma Urology consultation Ureterolysis and insertion of a J-stent Absence of trauma

surgical morbidity. Indeed, cystoscopies are relatively invasive procedures and are associated with a higher number of urinary infections, urinary bleeding, vesical traumas, and urinary retention.⁷ Possible causes of retention include swelling obstructing the flow of urine, or bladder distention leading to subsequent temporary weakening of the voiding muscles. In previous studies, the risk of urinary tract infection was found to be between 5% and 8%.⁸

In our study, the rate of morbid event occurrence is 3.44%. However, it is important to mention that the causality link with cystoscopy is hard to prove in the case of urinary tract infection and urinary retention. (**Table 2**).

If we consider as morbid only the false positive cases, which have led to additional investigations or unnecessary surgical procedures, there are 13 false positives out of 524 cases (2.48%). These events are the only cases for which a causal relation with cystoscopy can be definitely established.

Regarding the first secondary objective, we have identified 13 urinary complications for a rate of 2.45% (**Table 3**). This is within the range of the complication rate of 0.73%–4% that is found in the literature.^{9–11}

It should be noted that for the two objectives mentioned so far, we have to consider losses to follow-up. Indeed, 84% of the study patients were seen postoperatively. The remaining 16% have either not been seen again or the information was missing. A number of them were seen in another center or in a private office for which data is not accessible. In addition, since some of the surgeries were performed several years ago, certain charts have been destroyed. The possibility that some patients have sought medical attention in another center for urinary complications should be acknowledged. Centralized patient charts available in Quebec cannot currently be used for research purposes, which is a barrier to tracking data from other centers.

In the literature, the detection rate by cystoscopies is 90% for unsuspected ureteral lesions and 85% for vesical

lesions.¹² In our study, 7 urinary complications were identified before a cystoscopy was even performed. Out of the 6 remaining urinary complications, 4 were detected by cystoscopy and 2 were not. Certain types of urinary traumas are sometimes not identified by cystoscopy, such as traumas of thermic origin secondary to devascularization or those caused by a suture leading to necrosis. One of the 2 false negative cases was indeed a microtrauma. The second, however, was a complete transection of the ureter, and this kind of trauma should have been detected by cystoscopy.

In addition, in most previous studies addressing detection rate, cystoscopies were performed using indigo carmine in order to properly visualize ureteral jet flow.^{5,11,12} Since a few years it has been impossible to access this product in our hospitals in Canada. Thus, we no longer use coloring solution during our routine cystoscopies, which is a hypothesis that could explain why our detection rate is inferior to that reported in the literature.

Finally, in the analysis of the relevance of routine cystoscopies during TLHs, it is necessary to discuss the costs versus benefits of this procedure. As a matter of fact, performing a routine cystoscopy during a TLH increases operating time and represents an additional cost during the surgery. A 2019 study reported that routine cystoscopies during TLHs are only cost-effective if the rate of vesical traumas is superior to 47% and the rate of ureteral trauma is superior to 37%.¹³ These rates are much higher than those observed in our centers.

Considering the financial aspect in addition to the extra morbidity, the usefulness of routine cystoscopy is questionable in our centers. However, the only morbid events that can be directly associated to cystoscopy are the false positives which led to unnecessary investigations or procedures. In these situations, laparoscopy allows direct visualization of the ureter if a ureteral trauma is suspected. This meticulous visualization could avoid an unnecessary cannulation in the false positive cases, consequently

reducing morbidity. Cystoscopy; however, remains the gold standard when a vesical trauma is suspected.

The strengths of our study are the number of reviewed charts and the fact that few studies have addressed this subject in the past. Its limitations are the retrospective design, the losses to follow-up and the absence of a control group.

CONCLUSION

The usefulness of routine intraoperative cystoscopies during TLHs is questionable due to the number of morbid events and the low rate of urinary trauma in our centers. However, it is hard to establish a direct causal relation between certain morbid events and cystoscopies. Additional studies should investigate this topic.

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